



# POLLUTION PREVENTION METAL FINISHERS WORKSHOP POST-WORKSHOP SURVEY REPORT

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Prepared by  
Arizona Department of Environmental Quality  
Hazardous Waste Section x  
Facilities Assistance Unit

1110 West Washington Street  
Phoenix, AZ 85007  
602-771-2300 - [www.adeq.state.az.us](http://www.adeq.state.az.us)

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## **Executive Summary**

A series of workshops for metal finishers was conducted in the fall of 2001. The workshops were sponsored by five organizations, the US EPA Region IX, Arizona Department of Environmental Quality, City of Phoenix, American Electroplaters and Surface Finishers Society (AESF), and the Arizona Water Pollution Control Association (AWPCA). The Waste Water Compliance and Pollution Prevention Workshop was held on December 4, 2001.

To determine the effectiveness of the pollution prevention portion of the workshop, ADEQ staff conducted a follow up survey. The survey found the workshop generated 25 pollution prevention process improvements at the facilities that attended the workshop. With this number of process changes, it can be stated that the workshop generated enough interest in reducing pollution to motivate facilities to action. This high number of pollution prevention process changes shows the positive impact of workshops in encouraging facilities to implement and expand their P2 activities. The survey shows that the attendees value and used the information received at the workshop. Future pollution prevention assistance was also requested. Specific future assistance to consider could be EMS training. Thirteen facilities are interested in implementing an EMS program, but none reported doing so. Possibly a series of workshops using the metal finishing EMS template would provide the necessary incentive.

## **Introduction**

A series of three workshops for metal finishers was conducted in the fall of 2001. The workshops were sponsored by five organizations, the US EPA Region IX, Arizona Department of Environmental Quality, City of Phoenix, American Electroplaters and Surface Finishers Society (AESF), and the Arizona Water Pollution Control Association (AWPCA). The topics covered in the three workshops were air, water and hazardous waste compliance and pollution prevention. The workshop held on December 4, 2001 at the South Mountain Environmental Center was dedicated to waste water compliance and pollution prevention. To determine the effectiveness of the pollution prevention portion of the workshop, ADEQ staff conducted a follow up survey. This report summarizes the findings of the survey.

## **Survey Methods and Response**

Workshop attendees were surveyed regarding the implementation of P2 measures at their facilities. The follow up survey (Appendix A) was designed to mirror parts of the workshop evaluation that attendees completed at the end of the workshop. The follow up survey included a table and multiple choice questions consisting of yes and no questions, and open ended questions. The survey was conducted approximately nine months after the workshop. It was felt that this time frame would provide facilities with sufficient time to implement or plan the P2 measures that they would be incorporating because of information received at the workshop. Survey responses were obtained from nine different facilities. This initial response may be considered low. However, six of the 23 facilities either were no longer in the metal finishing business or the person who attended was no longer at the facility.

A two page questionnaire with both multiple choice, yes no, and open ended questions was used. The questionnaire and cover letter were mailed to 23 workshop attendees and included a postage paid envelope to encourage quick easy return. Several surveys were returned initially. To improve the response, telephone calls were made to the attendees. The result being a total of nine surveys returned and the discovery that several facilities were no longer in the metal finishing business and that some of the attendees had either changed companies or retired.

To summarize, twenty three facilities were represented at the workshop, nine facilities returned the survey, six facilities no longer were in a position to provide valuable data, and eight facilities did not respond at all.

### Survey Data

The workshop evaluation form (Appendix B) asked respondents what the likelihood would be that they would implement certain pollution prevention processes presented in the workshop. The responses possible were definitely, maybe or unlikely. Twelve facilities responded to section titled, “What P2 Topics Will You Discuss with Metal Finishers in Your Area?” The follow up survey asked the respondents to report on the status of implementation of the various pollution prevention processes listed on the evaluation.

The first section of the follow-up survey contained a table with thirteen P2 options listed. The items listed in the table were from the workshop evaluation filled out at the workshop. The attendees were asked to report on whether or not they had implemented or were planning to implement any of the P2 topics from the workshop. By comparing the perceived usefulness and the actual implementation rates, one can ascertain if the perceived usefulness matched actual implementation. The following charts detail the responses found on the evaluation and the survey.

#### 1. Drag Out Measurement

Workshop evaluation response: The evaluation asked if the facility would measure the amount of drag out on their various production lines. The following table displays the number of facilities responding to the question.

Definitely	Maybe	Unlikely
4	8	0

Survey response: The questionnaire asked if the facility actually measured drag out on their various production lines. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
2	1	1	0	0	0	0	0

## 2. Withdrawal rate

Workshop evaluation response: The evaluation asked if the facility would change the withdrawal rate to allow less of the plating solution to remain on the parts. The following table displays the number of facilities responding to the question.

Definitely	Maybe	Unlikely
5	7	0

Survey response: The questionnaire asked if the facility changed its withdrawal rate. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
1	0	0	1	0	2	3	3

## 3. Increased hang time

Workshop evaluation response: The evaluation wanted to know if the facility would increase the hang time to allow more plating solution to drain into the plating tank. The following table displays the number of facilities responding to the question.

Definitely	Maybe	Unlikely
5	7	0

Survey response: The questionnaire asked if the facility increased the hang time to allow for more plating solution to drain into the plating tank. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
4	1	1	2	1	2	1	1

#### 4. Changed tilt to improve drain

Workshop evaluation response: The evaluation wanted to know if the facility would change the tilt of the parts being plated to allow for greater drainage. The following table displays the number of facilities responding to the question.

Definitely	Maybe	Unlikely
7	5	0

Survey response: The questionnaire wanted to know if the facility did change the tilt of parts on racks to allow for greater drainage. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
3	1	1	1	2	2	0	2

#### 5. Changed part orientation on racks

Workshop evaluation response: The evaluation wanted to know if the facility changed the way parts were placed on racks to allow for increased drainage. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
5	5	2

Survey response: The questionnaire wanted to know if the facility did change the orientation of parts on the racks to allow for increased drainage. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
1	1	0	0	1	2	3	2

## 6. Started regular rack maintenance program

Workshop evaluation response: The evaluation wanted to know if the facility would begin a maintenance program where they would regularly inspect the racks and then perform required maintenance if required. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
3	4	4

Survey response: The questionnaire wanted to know if the facility did start a regular rack maintenance program. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
1	1	0	0	1	2	3	2

## 7. Implemented conductivity controlled rinsing

Workshop evaluation response: The evaluation wanted to know if the facility would implement a rinsing system that used conductivity as a method of control. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
5	5	2



Survey response: The questionnaire wanted to know if the facilities did implement a conductivity controlled rinsing system. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
2	1	1	0	1	5	0	0

### 8. Optimized rinse system

Workshop evaluation response: The evaluation wanted to know if the facilities would use any of the techniques presented such as agitation, flow control or tank layout to increase the efficiency of their rinse systems. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
4	7	1

Survey response: The questionnaire wanted to know if the facilities did use one of the techniques to optimize their rinse systems. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
4	3	0	1	1	2	1	1

### 9. Implemented a bath life extension program

Workshop evaluation response: The evaluation wanted to know if the facilities would institute any changes to extend the life of their baths such as scheduling bath changes based on bath conditions not calendar time expired. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
7	5	0

Survey response: The questionnaire wanted to know if the facility did implement a program to extend the life of their baths. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
5	3	0	2	1	2	0	1

#### 10. Evaluated reject/rework connections in regards to P2

Workshop evaluation response: The evaluation wanted to know if the facility would analyze the items rejected or needing rework to see if by implementing pollution prevention techniques the amount of rejected and reworked pieces could be reduced. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
7	4	1

Survey response: The questionnaire wanted to know if facilities did evaluate their rejects and rework connections in regard to pollution prevention options. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
2	1	0	1	0	4	1	2

#### 11. Implemented a P2 worker training program

Workshop evaluation response: The evaluation wanted to know if the facilities would implement a P2 worker training program. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
8	3	0

Survey response: The questionnaire wanted to know if the facilities did implement a P2 training program for their workers. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
4	1	1	2	1	2	0	2

## 12. Used the EMS Metal Finishing Template

Workshop evaluation response: The evaluation wanted to know if the facilities would use the EMS metal finishing template to EMS template presented at the workshop. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
9	3	0

Survey response: The questionnaire wanted to know if the facilities actually used the EMS template presented at the workshop. The following table displays the responses of the facilities responding to the question. It is important to note that on the workshop survey response, 13 respondents reported they would be or might use the EMS Metal Finishing Template but in reality, no one implemented this program. Perhaps using the EMS Metal Finishing template as a tool for a series of EMS workshops would provide incentive for actual implementation.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
0	0	0	0	0	7	0	2

## 13. Implemented steps from the MP & M “pollution prevention track”

Workshop evaluation response: The evaluation wanted to know if the facilities would use the pollution prevention track of the metal products and machinery (MP & M) regulations. The following table displays the number of facilities responding to the three choices.

Definitely	Maybe	Unlikely
7	4	0

Survey response: The questionnaire wanted to know if the facilities implemented steps from the MP & M “pollution prevention track”. The following table displays the responses of the facilities responding to the question.

Number of Facilities Implementing Changes	Yes	Currently Implementing	In Planning Stages	Previously Implemented	No	Not Applicable	Left Blank
1	0	0	1	0	6	0	2

The second section of the survey consists of 13 questions on a variety of issues relating to pollution prevention implementation. Details of the responses to the second section are below.

**1. If you didn’t implement any of your planned changes, what road blocks did you encounter?**

Could not work it into my schedule	1 yes	4 no	4 no reply
Could not work it into the production schedule	1 yes	4 no	4 no reply
Need to do a cost analysis before implementation	3 yes	1 no	5 no reply
Had to wait for next budget cycle	4 yes	1 no	4 no reply
Funding not available	3 yes	1 no	5 no reply
Need management support	1 yes	2 no	6 no reply

**2. Additional hindrances you encountered (please describe)**

1. Too many things to do, hard to concentrate on this project/ to complicated
2. This particular workshop was not applicable to the process which has no rinse tanks or drag-out as parts are rinsed directly over the tank. Racks are not used
3. Lack of resources (personnel) to implement and maintain P2 projects

**3. Need additional information. If so, what?**

1. no
2. Other workshops have been very worthwhile. Please continue to offer this type of assistance.

**4. Did you purchase or install any equipment?**

2 yes      6 no      1 no reply

If so, what

1. Low pressure, low volume nozzles.
2. Thermal Water Evaporator (rated at 126 GPH) resulting in “zero discharge” and modification/elimination of our “industrial Waste Discharge permit”.

**5. Did you implement any other changes in practices or procedures?**      4 yes 5 no  
If so, what

1. Adding stagnate dragout tanks after hot tank, and using spray rinse above some tanks.
2. We use static rinse tanks due to the low volume of work we do. The rinse water is used to replenish the plating baths. This reduces our water usage and waste generation.
3. Stepped up employee training program.
4. Employee training was increased.

**6. Have you experienced any reductions in the following:**

raw material usage	4 yes	4 no	1 no reply
dragout	2 yes	5 no	2 no reply
waste generation	5 yes	2 no	2 no reply
water usage	5 yes	3 no	1 no reply
energy usage	1 yes	5 no	3 no reply

**7. Can you give us the numbers on these reductions?**

1 yes      6 no      2 no reply

Comments:

Not at this time, still monitoring process and usage, but has seem to have a reduction

Amount of Hazardous Waste Generated Per Year in Tons	
1997	175
1998	171
1999	170
2000	134
2001	100
2002	55 * estimated see attached

**8. If so, would you be willing to share?**      1 yes      6 no      2 no reply

**9. Can we quote you?**      0 yes      7 no      2 no reply

**10. If you think you have, but can't quantify it, could we follow up in the future and have EPA's outside contractor help you get the numbers?**

0 yes      7 no      2 no reply

1. Currently using a spreadsheet to monitor chemicals purchased and used to see actual numbers.

**11. In what ways has the workshop helped you improved your compliance?**

1. Started on developing an awareness and investigating possibilities. Need to

implement procedures for dragout reduction. We do barrel plating w/s was directed to rack-work.

2. Helped me gain the knowledge on the new technology that is out there being used.
3. We will be implementing P2 strategies as our facility is remediated. The plating floor is being rebuilt and these learned strategies will be designed into the new line.
4. Lowered chemical consumption through bath life extension.
5. This particular workshop did not offer information pertinent to our plating process. Other offers from ADEQ have been very useful. We thank you for putting on the workshops. We have an opportunity to meet the regulators working with our industry and appreciate the chance to communicate.
6. Allowed other facility employees to become knowledgeable in P2 and therefore provided employees the ability to work together to maintain compliance.

**12. Can we quote you?**    2   yes                      4   no                      3   no reply

**13. What kinds of assistance would be helpful in the future?**

The preferred types of assistance are “hands on” and lecture.

*Actual results*

Hands on	5	
Lecture	7	
One on one with contractor	1	
Other	1	Literature/handouts etc.(GTI)

### Results Summary

Seven facilities returning the survey either had implemented changes in their processes or were in the planning stages, with the majority making multiple changes. Only two reported that they did not or were not planning on making any changes.

From the responses, it appears that items dealing with determining the costs of a project and obtaining funding for projects are major sources of roadblocks. Although two facilities reported purchasing equipment.

Most of the reductions seen were in raw material usage, waste generation and water usage. Which follows with four facilities reporting implementing a bath life extension program, four optimizing their rinse systems, three increasing the hang time, four changing the tilt, and three implementing conductivity controlled rinsing. Only one facility had hard numbers on the amount of reductions yet no one was willing to have an outside contractor follow up to help get actual reduction amounts.

Comments throughout the survey showed the facilities found the workshop to be very helpful. Because of the value of this workshop, facilities are interested in obtaining additional assistance through lectures and hands on workshops.

### Conclusions

The workshop generated a number of pollution prevention process improvements at the facilities

attending the workshop. With a total of 25 process changes implemented due to the workshop, it can be stated that the workshop generated enough interest in reducing pollution to motivate facilities into action. A total of 12 changes have been implemented, four are currently being implemented, and nine are in the planning stages. This high number of pollution prevention process changes shows the positive impact of workshops in encouraging facilities to implement and expand their P2 activities.

The survey shows attendees used the information presented and were able to see actual reductions in raw material usage, waste generation, and water usage. However, the amount of reductions currently can not be quantified except in once case. The facilities also show a reluctance to bring an outside contractor into the shop for assistance in quantifying reduction numbers. It is unclear whether it would be the time involved with providing the contractor with the necessary data to do the analysis or having a government contractor on site observing.

The survey shows that the attendees value and used the information they received at the workshop. Future pollution prevention assistance was also requested.